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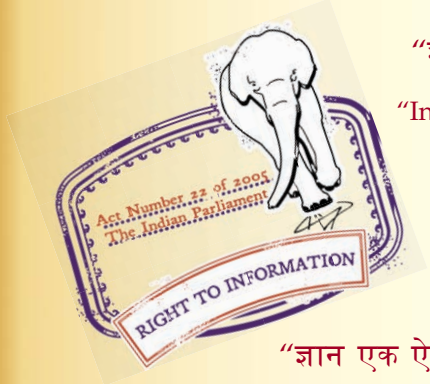

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"Knowledge is such a treasure which cannot be stolen"

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IS : 8058 - 1976

Indian Standard

SPECIFICATION FOR PYRIDINE

UDC 667·271 : 547·821

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1976

AMENDMENT NO. 1 FEBRUARY 1989

TO

IS : 8058 - 1976 SPECIFICATION FOR PYRIDINE

[*Page* 5, *Table* 1, *col* 4, *Sl No.* (ii)] — Substitute '98 0' *for* '98'.

[*Page* 5, *Table* 1, *col* 3, *Sl No.* (x)] — Substitute '0 10' *for* '0 1'.

[*Page* 5, *Table* 1, *col* 4, *Sl No.* (x)] — Substitute '0·20' *for* '0 2'.

[*Page* 5, *Table* 1, *col* 5, *Sl No.* (x)] — Substitute '0·40' *for* '0 4'.

(PCDC 9)

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Indian Standard

SPECIFICATION FOR PYRIDINE

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Indian Standard

SPECIFICATION FOR PYRIDINE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 6 May 1976, after the draft finalized by the Organic Chemicals (Miscellaneous) Sectional Committee had been approved by the Chemical Division Council.

0.2 Pyridine is used as solvent in dyestuff industry, pharmaceutical industry and as a laboratory reagent. It is also used in the manufacture of drug intermediates like 2-aminopyridine, 2, 6-diaminopyridine, pheniramine and zelan which is used in waterproofing fabrics. It also finds use in making decapryn, ritalin and pipradol, and pesticides.

0.3 Pyridine bases as denaturant are covered under IS : 324-1959* and IS : 4117-1973†.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for pyridine.

2. GRADES

2.1 There shall be three grades of the material, namely,

Grade 1 — as a reagent in analytical chemistry and for special pharmaceutical preparations,

Grade 2 — Suitable for use in the manufacture of drug intermediates, and

Grade 3 — mainly used as a solvent in dyestuff industry.

*Specification for ordinary denatured spirit (*revised*).
†Specification for alcohol denaturants.
‡Rules for rounding off numerical values (*revised*).

3. REQUIREMENTS

3.1 Description — The material shall be a clear liquid free from foreign matter. It shall also have a characteristic disagreeable odour of pyridine.

3.2 Solubility — The material shall be miscible with water, alcohol, chloroform and ether. It shall also pass the following test:

Mix 10 parts of the material in 90 parts of water and shake the mixture. The material shall be clear and homogeneous.

3.3 Identity and Purity — From chromatographic examination (*see* **A-3**), the material shall appear identical or at least equivalent to the standard material.

3.4 The material shall also comply with the requirements prescribed in Table 1 when tested according to the methods prescribed in Appendix A. Reference to the relevant clauses of the appendix is given in col 6 of the table.

4. PRECAUTIONS IN STORING AND HANDLING

4.1 As pyridine is flammable, necessary safeguards against the risk arising from storage and handling of large volumes of flammable liquids shall be provided and all due precautions taken at all times to prevent accident by fire or explosion. It shall be stored in a cool place. Open flames and smoking shall not be allowed where it is stored or handled. Storage vessels shall be vented to safe atmosphere.

4.2 Except when they are opened for the purpose of cleaning and rendering them free from pyridine vapours, all empty tanks and other containers shall be securely closed.

5. PACKING AND MARKING

5.1 Packing — The material shall be packed in mild steel drums. The gaskets for the bungs shall be of high density polyethylene.

5.2 Marking — The containers shall be suitably marked with the following information:

a) Name and grade of the material;
b) Net mass of the material in the container;
c) Name of the manufacturer and his recognized trade-mark, if any;
d) Batch number or lot number, in code or otherwise; and
e) The symbol given in Fig. 5 of IS : 1260 (Part I)-1973* and the words 'HARMFUL, VAPOUR FLAMMABLE. KEEP IN COOL PLACE' in capitals.

*Pictorial markings for handling and labelling of goods: Part I Dangerous goods (*first revision*).

TABLE 1 REQUIREMENTS FOR PYRIDINE

(*Clause* 3.4)

Sl No.	Characteristic	Requirement for			Method of Test (Ref to Cl No. in Appendix A)
		Grade 1	Grade 2	Grade 3	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Relative density* at 25°C/25°C	0·985	—	—	A-2
ii)	Pyridine content, percent by mass, *Min*	98·5	98	96·5	A-3
iii)	Boiling range at 760 mm Hg	2 to 97 percent by volume, shall distil between a range of 2°C including 115°C	2 to 97 percent by volume, shall distil between a range of 2°C including 115°C	2 to 97 percent by volume, shall distil between a range of 4°C including 115°C	A-4
iv)	Residue on evaporation, percent by mass, *Max*	0·002	—	—	A-5
v)	Ammonium compounds (as NH_4), percent by mass, *Max*	0·002	—	—	A-6
vi)	Chlorides (as Cl), percent by mass, *Max*	0·001	—	—	A-7
vii)	Copper (as Cu), percent by mass, *Max*	0·000 5	—	—	A-8
viii)	Oxidizable substances	To pass test	—	—	A-9
ix)	Sulphates (as SO_4), percent by mass, *Max*	0·001	—	—	A-10
x)	Moisture, percent by mass, *Max*	0 1	0·2	0·4	A-11

*Relative density is the term adopted by ISO for specific gravity with water as reference substance.

5.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 The procedure for sampling and the criteria for conformity of the material shall be as prescribed in Appendix B.

APPENDIX A

(*Clause* 3.4 and *Table* 1)

METHODS OF TEST FOR PYRIDINE

A-1. QUALITY OF REAGENTS

A-1.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960*) shall be used in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-2. DETERMINATION OF RELATIVE DENSITY

A-2.0 Outline of the Method — In this method, mass of equal volumes of the material and water are compared at 25°C.

A-2.1 Apparatus

A-2.1.1 *Relative Density Bottle* — 25-ml capacity.

A-2.1.2 *Water-Bath* — maintained at 25·0 ± 2°C.

A-2.1.3 *Thermometer* — Any convenient thermometer of a suitable range with 0·1 or 0·2°C subdivisions.

A-2.2 Procedure — Clean and dry the relative density bottle. Weigh and fill with recently boiled and cooled water at 25°C. Fill to overflowing by holding the relative density bottle on its side in such a manner as to prevent entrapment of air bubbles. Insert the stopper and immerse in the water-bath. Keep the entire bulb covered with water and hold at that temperature for 30 minutes. Carefully remove any water which has exuded from the capillary opening. Remove from the bath, wipe completely, dry and weigh. Again clean and dry the relative density bottle. Using the material under test, proceed exactly as in the case of water and weigh the bottle with the material.

A-2.3 Calculation

$$\text{Relative density at } 25°C/25°C = \frac{A - B}{C - B}$$

*Specification for water, distilled quality (*revised*).

where

A = mass in g of the relative density bottle with the material,

B = mass in g of the relative density bottle, and

C = mass in g of the relative density bottle with water.

A-3. DETERMINATION OF PYRIDINE CONTENT

A-3.0 Outline of the Method — The content of pyridine alongwith other components is determined by gas chromatography.

A-3.1 Apparatus

A-3.1.1 *Gas Chromatograph* — with flame-ionization detector.

A-3.1.2 *Potentiometric Strip Chart Recorder* — full scale deflection, 1 second (preferably provided with either a mechanical disc or electronic integrator).

A-3.1.3 *Temperature Programmer*

A-3.1.4 *Column* — of stainless steel or glass, 1·8 m long, 3·0 mm diameter *packed with 15 to 20 percent carbowax 400 or 1 500 on chromosorb* W 180-150 micron.

A-3.2 Test Substances

A-3.2.1 *Pyridine*

A-3.2.2 *Alpha and Beta Picolines*

A-3.2.3 *Standard for Analysis* — 1·0 percent xylene, 5 percent alpha picoline, 93 percent pyridine and 1·0 percent beta picoline.

A-3.3 Procedure

A-3.3.1 *Operating Parameters of Gas Chromatograph* — are as follows.

A-3.3.1.1 *Injection temperature* — 150 to 180°C.

A-3.3.1.2 *Column temperature* — 80 to 100°C.

A-3.3.1.3 *Detector temperature* — 130 to 150°C.

A-3.3.1.4 *Carrier gases* — nitrogen (99·99 percent purity on *v/v* basis); flow rate: 30 ml/min. Hydrogen gas, flow rate: 30 ml/min. Compressed air, flow rate: 300 ml/min.

A-3.3.1.5 *Chart speed*

Slow:	75 cm/h
Medium:	150 cm/h
Fast:	300 cm/h

A-3.3.2 *Calibration Factor or Response Factor*— Inject 0·5 microlitre of standard sample into the gas chromatograph by means of a microsyringe and get the chromatograms within the chart range by means of a proper attenuation. Apply the following steps to calculate the correction factor:

a) Calculate the areas by peak height × width at half height method, if the unit is not provided with integrator system.

b) Calculate the area/mass (A/M) ratio by dividing the area of each peak by its mass:

Component	*Mass, percent*	*Area*	*A/M*
Xylene	1·0	A_1	$A_1/1{\cdot}0 = K$
Pyridine	93·0	A_2	$A_2/93{\cdot}0 = L$
Alpha picoline	5·0	A_3	$A_3/5{\cdot}0 = M$
Beta picoline	1·0	A_4	$A_4/1{\cdot}0 = N$

Set arbitrarily xylene response factor to 1 0 and find response factor of other components as follows:

Component	*Slope*	*Response Factor*
Xylene	K/K	1·000 0
Pyridine	K/L	Value obtained
Alpha picoline	K/M	do
Beta picoline	K/N	do

A-3.3.3 *Elution Order* — Elution order of the component is xylene, pyridine, alpha picoline and beta picoline.

A-3.3.4 *Test Sample* — Inject 0·50 microlitre of test sample into gas chromatograph and get the chromatograms within the chart range by means of proper attenuation system.

Calculate the areas of the peaks and multiply the calculated areas by their relative response factors to get the true areas of the peaks. Add up these areas to get the total true peak area.

A-3.3.5 *Calculation*

$$\text{Component 'n' in the sample, percent by mass} = \frac{A_n \times 100 - m}{A_t}$$

where

A_n = peak area of component 'n',

m = percent of water in the sample, and

A_t = total true peak area.

A-4. DETERMINATION OF BOILING RANGE

A-4.1 Procedure — Determine the boiling range by the procedure prescribed in IS : 5298-1969* applying the following corrections.

A-4.1.1 *Correction of Thermometer Reading*

A-4.1.1.1 *Error of scale* — In all thermometer readings, make the corrections as indicated on the certificate of the instrument.

A-4.1.1.2 *Correction for barometric pressure* — If the barometric pressure prevailing during the determination is 760 mm Hg, no correction need be applied to the specified temperature and the thermometer scale as corrected for error of scale may be used as such. If, however, the prevailing barometric pressure deviates from 760 mm Hg, the specified temperature shall also be corrected as follows:

a) For every 27 mm above 760 mm Hg, subtract 1°C from the specified temperature; and

b) For every 27 mm below 760 mm Hg, add 1°C to the specified temperature.

NOTE — These corrections are valid only for pressures above 700 mm Hg.

A-5. DETERMINATION OF RESIDUE ON EVAPORATION

A-5.1 Apparatus

A-5.1.1 *Porcelain Basin* — 150-ml capacity (*see* IS : 2837-1964†).

A-5.1.2 *Oven* — capable of maintaining temperature of 105 ± 2°C.

A-5.2 Procedure — Weigh the porcelain basin. Cool the material to 0°C and by means of a pipette with rubber bulb aspirator, transfer 100 ml of the material to the tared porcelain basin. Allow the material to evaporate at room temperature and then heat the residue in the oven at 105 ± 2°C for 30 minutes. Cool in a desiccator and weigh accurately.

A-5.3 Calculation

$$\text{Residue on evaporation, percent by mass} = \frac{M_1 - M}{V \times d} \times 100$$

where

M_1 = mass in g of the basin with the residue,

M = mass in g of the basin,

V = volume in ml of the material taken for the test, and

d = relative density of the material as determined under **A-2.**

*Method for determination of distillation range and distillation yield.

†Specification for porcelain crucibles and basins.

A-6. TEST FOR AMMONIUM COMPOUNDS

A-6.0 Outline of the Method — The solution of the sample is treated with sodium hydroxide and filtered. To the filtrate, Nessler solution is added and the colour produced is compared with that produced in a control test containing definite amount of ammonium salt.

A-6.1 Reagents

A-6.1.1 *Sodium Hydroxide Solution* — 10 percent (*m/v*).

A-6.1.2 *Nessler Solution* — Dissolve 143 g of sodium hydroxide in 700 ml of water. Dissolve 50 g of red mercuric iodide and 40 g of potassium iodide in 200 ml of water. Pour the iodide solution into hydroxide solution and dilute to 1 000 ml. Allow to settle and use the clear supernatant liquid.

A-6.1.3 *Standard Ammonium Chloride Solution* — Dissolve 0·296 g of ammonium chloride (NH_4Cl) in water and dilute to 100 ml. Dilute 10 ml of this solution to 1 000 ml. One millilitre of the diluted solution is equivalent to 0·01 mg of ammonium (as NH_4).

A-6.2 Procedure — Weigh 1·000 g of the material and dilute to 45 ml and add 15 ml of sodium hydroxide solution. Filter through a sintered glass crucible, previously washed with sodium hydroxide solution. Dilute with water to 100 ml and add 2 ml of Nessler solution. In a control test, having an equal volume (100 ml) of the solution and containing 2 ml of standard ammonium chloride solution and 15 ml of sodium hydroxide solution, add 2 ml of Nessler solution.

A-6.2.1 The limit prescribed in Table 1 shall be taken as not having been exceeded if the colour produced with the material is not darker than that produced with the standard solution.

A-7. DETERMINATION OF CHLORIDE

A-7.1 Reagents

A-7.1.1 *Concentrated Nitric Acid* — conforming to IS : 264-1968*.

A-7.1.2 *Standard Silver Nitrate Solution* — 0·1 N.

A-7.1.3 *Nitrobenzene*

A-7.1.4 *Standard Ammonium Thiocyanate Solution* — 0·1 N.

A-7.1.5 *Ferric Ammonium Sulphate Indicator* — approximately 5 percent.

A-7.2 Procedure — Weigh accurately about 20 g of the material, dissolve in water and neutralize with concentrated nitric acid and then add about

*Specification for nitric acid (*first revision*).

5 ml in excess. Boil the solution to expel any dissolved carbon dioxide gas, cool and add 10 ml of standard silver nitrate solution. Add 3 ml of nitrobenzene, shake vigorously and titrate with standard ammonium thiocyanate solution using ferric ammonium sulphate indicator.

A-7.3 Calculation

$$\text{Chlorides (as Cl), percent by mass} = \frac{3{\cdot}55\ (10\ N_1 - VN_2)}{M}$$

where

N_1 = normality of standard silver nitrate solution,

V = volume in ml of standard ammonium thiocyanate solution consumed in the titration,

N_2 = normality of standard ammonium thiocyanate solution, and

M = mass in g of the material taken for the test.

A-8. TEST FOR COPPER

A-8.1 Apparatus

A-8.1.1 *Nessler Cylinders* — 50 ml capacity.

A-8.2 Reagents

A-8.2.1 *Concentrated Hydrochloric Acid* — conforming to IS : 265-1962*.

A-8.2.2 *Concentrated Nitric Acid* — conforming to IS : 264-1968†.

A-8.2.3 *Citric Acid*

A-8.2.4 *Dilute Ammonium Hydroxide* — approximately 5 N.

A-8.2.5 *Sodium Diethyldithiocarbamate Solution* — Dissolve 1·0 g of sodium diethyldithiocarbamate in 1 000 ml of copper-free water. Filter and keep in an amber bottle and protect from strong light.

A-8.2.6 *Standard Copper Solution* — Dissolve 0·392 8 g of copper sulphate pentahydrate in copper-free water and make up the volume to 1 000 ml. Take 100 ml of this solution and dilute again to 1 000 ml. One millilitre of the diluted solution contains 0·01 mg of copper (as Cu).

A-8.2.7 *Chloroform* — *See* IS : 5296-1969‡.

A-8.3 Procedure — Weigh 6·000 g of the material and dissolve it in about 50 ml of water. Neutralize with concentrated hydrochloric acid and add 4 to 5 drops of concentrated nitric acid. Boil and cool. Add 1 g of citric

*Specification for hydrochloric acid (*revised*).
†Specification for nitric acid (*first revision*).
‡Specification for chloroform, technical and analytical.

acid and adjust *p*H to 9 by adding dilute ammonium hydroxide. Add 10 ml of sodium diethyldithiocarbamate solution and extract the yellow colour produced four times with 2·5 ml portions of chloroform. Collect the chloroform extracts and filter through dry filter into a Nessler cylinder. Carry out a control test using 3 ml of standard copper solution in place of the material.

A-8.3.1 The material shall be considered not to have exceeded the limit prescribed in Table 1 if the intensity of the colour produced with the material is not greater than that produced in the control test.

A-9. TEST FOR OXIDIZABLE SUBSTANCES

A-9.1 Reagents

A-9.1.1 *Standard Potassium Permanganate Solution* — 0·1 N.

A-9.2 Procedure — Take 5 ml of the material in a test tube and add 0·5 ml of standard potassium permanganate solution and shake thoroughly.

A-9.2.1 The material shall be taken to have passed the test if the pink colour produced does not entirely discharge in 30 minutes.

A-10. TEST FOR SULPHATES

A-10.0 Outline of the Method — The material is dissolved in water, denatured spirit and dilute hydrochloric acid added and mixed. Barium chloride solution is then added and turbidity compared with that produced by a known quantity of sulphate.

A-10.1 Apparatus

A-10.1.1 *One-Mark Graduated Flasks* — 100 and 1 000 ml (*see* IS : 915-1958*).

A-10.1.2 *Nessler Cylinders* — 50 ml (*see* IS : 4161-1967†).

A-10.2 Reagents

A-10.2.1 *Denatured Spirit* — *see* IS : 324-1959‡.

A-10.2.2 *Dilute Hydrochloric Acid* — approximately 5 N.

A-10.2.3 *Barium Chloride* ($BaCl_2.2H_2O$) *Solution* — 10 percent (*m/v*).

A-10.2.4 *Standard Sulphate Solution* — Dissolve 1·48 g of ignited sodium sulphate (Na_2SO_4) in water. Transfer quantitatively to the 1 000 ml one-mark graduated flask and make up the volume with water to the mark,

*Specification for one-mark graduated flasks.
†Specification for Nessler cylinders.
‡Specification for ordinary denatured spirit (*revised*).

Pipette 10 ml of this solution into the 100-ml one-mark graduated flask and make up the volume with water to the mark. One millilitre of this solution contains 0·1 mg of sulphate (as SO_4).

A-10.3 Procedure — Dissolve 10·0 g of the material in 40 ml of water and transfer quantitatively into one of the Nessler cylinders. Add 10 ml of denatured spirit and 1 ml of dilute hydrochloric acid; mix and add 1 ml of barium chloride solution. Allow to stand for 1 hour. In another Nessler cylinder carry out a control test under the same conditions using 1 ml of standard sulphate solution, 37 ml of water, 10 ml of denatured spirit, 1 ml of dilute hydrochloric acid, and 1 ml of barium chloride solution.

A-10.3.1 The material shall be taken to have not exceeded the limit prescribed for Grade 1 if the turbidity produced with the material is not greater than that produced in the control test.

A-11. DETERMINATION OF MOISTURE CONTENT

A-11.0 General — Moisture is determined by the Karl Fischer method.

A-11.1 Weigh accurately 20 g of the material and determine the moisture content by the procedure given in IS : 2362-1963*.

APPENDIX B

(*Clause* 6.1)

SAMPLING OF PYRIDINE

B-1. GENERAL REQUIREMENTS FOR SAMPLING

B-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

B-1.2 The sampling instrument shall be clean and dry.

B-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.4 To draw a representative sample, the contents of each container selected for sampling shall be mixed as thoroughly as possible by suitable means.

*Determination of water by Karl Fischer method.

B-1.5 The samples shall be placed in suitable, clean, dry and air-tight glass bottles or other suitable containers on which the material has no action.

B-1.6 The sample containers shall be of such a size that they are almost three-fourth filled by the sample.

B-1.7 Each sample container shall be sealed air-tight after filling, and marked with full details of sampling, the date of sampling and details given under **5.2**.

B-2. SCALE OF SAMPLING

B-2.1 Lot — All the containers in a single consignment of the material of the same grade drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the group of containers in each batch shall constitute separate lot.

B-2.2 For ascertaining the conformity of the material in any lot to the requirements of this specification, samples shall be tested for each lot separately.

B-2.3 The number of containers to be selected from the lot shall depend on the size of the lot and shall be in accordance with Table 2.

TABLE 2 NUMBER OF CONTAINERS TO BE SELECTED FROM LOTS OF DIFFERENT SIZES

LOT SIZE	SAMPLE SIZE
N	*n*
(1)	(2)
3 to 15	3
16 " 40	4
41 " 110	5
111 " 180	6
181 " 300	7
301 " 500	8
501 " 800	9
801 and above	10

B-2.4 The containers shall be chosen at random from the lot with the help of a suitable random number table. Reference may be made to IS : 4905-1968* for guidance to random selection procedures.

*Methods for random sampling.

B-3. TEST SAMPLE AND REFEREE SAMPLE

B-3.1 From each of the containers selected as in **B-2.3**, draw with the help of a sampling bottle a representative portion of the material from different parts of the container. Out of this portion from each container equal quantity of the material shall be taken and thoroughly mixed to form a composite sample of about 1 500 ml. This composite sample shall be thoroughly mixed and divided into three equal portions, one for the purchaser, another for the supplier and the third for the referee.

B-3.2 The remaining portion corresponding to each of the selected containers (**B-2.3**) shall be divided into three equal parts, each forming an individual sample. One set of individual samples representing the *n* containers selected shall be for the purchaser, another for the supplier and the third for the referee.

B-3.3 All the individual and composite samples shall be transferred to separate containers. These containers shall then be sealed air-tight with stoppers and labelled with full identification particulars given in **B-1.7**.

B-3.4 The referee samples consisting of a composite sample and a set of *n* individual samples shall bear the seals of both the purchaser and the supplier and shall be kept at a place agreed to between the two. These shall be used in case of any dispute between the two.

B-4. TESTS

B-4.1 Tests for pyridine content and moisture shall be conducted on individual samples.

B-4.2 Tests for the remaining characteristics shall be conducted on the composite sample.

B-5. CRITERIA FOR CONFORMITY

B-5.1 For Individual Samples — The lot shall be declared as conforming to the requirements of pyridine content and moisture if each of the test results on the individual samples satisfies the corresponding requirement of the test.

B-5.2 For Composite Sample — For declaring the conformity of a lot to the requirements of all other characteristics tested on the composite sample, the test results shall satisfy the relevant requirements given in **3** and Table 1.

INDIAN STANDARDS

ON

ORGANIC CHEMICALS (MISCELLANEOUS) MATERIALS

IS:

245-1970 Trichloroethylene, technical (*second revision*)
501-1963 Oxalic acid, technical and analytical reagent (*revised*)
716-1970 Pentachlorophenol (*first revision*)
717-1969 Carbon disulphide, technical (*first revision*)
718-1970 Carbon tetrachloride (*first revision*)
809-1969 Ethylene dichloride (*first revision*)
880-1956 Tartaric acid
3321-1973 Formaldehyde solution (*first revision*)
4105-1967 Styrene (venyl benzene)
4306-1973 Hexamethylenetetramine (hexamine) (*second revision*)
4566-1968 Methylene chloride (dichloromethane), technical
5149-1969 Maleic anhydride, technical
5158-1969 Phthalic anhydride, technical
5254-1969 Acentanilide
5271-1969 Paraformal dehyde
5295-1969 Ethylene glycol
5296-1969 Chloroform, technical and analytical
5297-1969 Perchloroethylene (tetrachloroethylene), technical
5341-1969 Benzyl chloride, technical
5464-1970 Citric acid, monohydrate
5573-1969 Ethylene oxide
5591-1969 Chlorobenzene
5592-1969 Monochloroacetic acid
5992-1969 p-Dichlorobenzene, technical
6393-1971 α-Phenylacetamide
6412-1971 Benzyl chloride, technical
6515-1972 Sodium pentachlorophenate, technical
6712-1972 *o*-Dichlorobenzene
6716-1972 Benzoic acid, technical
6718-1972 Phenoxyacetic acid
6768-1973 *m*-Aminophenol
6775-1973 Ethyl chloride, technical
6971-1973 2-ethyl hexan-1-OL
6972-1973 Benzo-trichloride, technical
7134-1973 Diphenyl
7135-1973 Dimethyl sulphate, technical
7220-1974 Ethylenediaminetatra-acetic-acid, pure and technical
7330-1974 Methods of test for ion-exchange resins
7559-1974 Salycylic acid
7618-1974 Hexachloroethane
7619-1974 Pentaerythritol
7729-1975 Sodium monochloroacetate
7901-1975 Triethanolamine, technical
7910-1975 Monoethanolamine
7911-1975 Diethanolamine
7918-1975 Diethylene glycol

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